

Listing of the Claims

1. (currently amended) A process of using chemical vapor deposition for producing transparent p-type conducting oxide films without co-doping, plasma enhancement or the use of high temperature, comprising:

(a) introducing a dialkyl metal at ambient temperature in a carrier gas into a low pressure deposition chamber, and

(b) introducing NO alone or with an oxidizer into said chamber under an environment sufficient to produce a metal-rich condition to enable NO decomposition and atomic nitrogen incorporation into the formed transparent metal conducting oxide at over about 2 atomic %;

said dialkyl is selected from the group consisting of dimethyl and diethyl.

2. (original) The process of claim 1 wherein said metal is selected from the group consisting of Zn, Cd, in, Sn, Ga and alloys thereof.

3. (original) The process of claim 2 wherein said transparent conducting oxide is selected from the group consisting of ZnO, CdO, In₂O₃, SnO₂, Ga₂O₃ and alloys thereof.

4. (original) The process of claim 3 wherein said carrier gas is selected from the group consisting of N₂ or Ar.

5. (original) The process of claim 4 wherein in step b) NO is introduced alone.

6. (original) The process of claim 5 wherein NO is introduced with an oxidizer.
7. (original) The process of claim 6 wherein said oxidizer is O₂.
8. (original) The process of claim 6 wherein said ambient temperature is about 23°C +/- 2°C.
9. (original) The process of claim 7 wherein said ambient temperature is about 23°C +/- 2°C.
10. (original) The process of claim 8 wherein said chamber pressure is about 30 torr.
11. (original) The process of claim 9 wherein said chamber pressure is about 30 torr.
12. (original) The process of claim 10 wherein total gas flow through said chamber during deposition is between about 2,000 to about 3,000 sccm.
13. (original) The process of claim 11 wherein total gas flow through said chamber during deposition is between about 2,000 to about 3,000 sccm.
14. (original) The process of claim 12 wherein said deposition temperature is between about 200 to about 550°C.

15. (original) The process of claim 13 wherein said deposition temperature is between about 200 to about 550°C.

16. (original) A p-type transparent conducting oxide film consisting essentially of a transparent conducting oxide formed from a dialkyl metal and a NO doping source, said oxide and said NO doping source being grown without co-doping, plasma enhancement or high temperature and under an environment sufficient to produce a metal rich condition to enable NO decomposition and atomic nitrogen incorporation into formed transparent metal conducting oxide at over about 2 atomic %.

17. (original) The film of claim 16 wherein said dialkyl is selected from the group consisting of dimethyl and diethyl and said metal is selected from the group consisting of Zn, Cd, In, Sn, Ga and alloys thereof.

18. (original) The film of claim 17 wherein said transparent conducting oxide is selected from the group consisting of ZnO, CdO, In₂O₃, SnO₂, Ga₂O₃ and alloys hereof.

19. (original) The film of claim 18 wherein said transparent conducting oxide is ZnO.